

## **Why do we use LSB for 40 Metre and below and USB above 40 Metre ? – Page 1**

At the beginning of Amateur Radio Single Side band introduction rigs were home made, usually from a design published in one of the radio magazines. These early home brew SSB rigs used a 9 MHz IF, and with a 5 to 5.5 MHz VFO they could be used on both 3.5 MHz and 14 MHz. The VFO tuned from 5.00 MHz for 20 Metre and 5.5MHz down for 80 Metre. This set the standards for the side band that we use today as LSB on and below 7MHz and USB above 7MHz. As we will see in this article, Yaesu and other manufacturers continued this method and included additional Heterodyne crystals to operate on the other bands.

### **Typical early BoatAnchor SSB generation and reception as found in the FT-200**

Carrier oscillators are 9.0015 MHz and 8.9985 MHz

SB in normal position:- 8.9985 is used for 7 (LSB) and 14 (USB) MHz band, and 9.0015 MHz is used for the 3.5 (LSB), 21 (USB) and 28 (USB) MHz bands.

A band switched heterodyne oscillator is used on 7 MHz, 21, MHz and 28 MHz Conversion on the 80 and 20 Metre bands is directly from the VFO

VFO tunes between 5.00 and 5.50 MHz.

### **Band Mixing Frequencies**

3.5 MHz (80M Band) - (VFO) The 5.0 to 5.5 is mixed with the signal frequency by addition to give the 9.00 MHz IF frequency (LSB is normal mode, carrier oscillator is 9.0015 MHz)

7.0 MHz (40M Band) - 11.00 MHz heterodyne. The 5.0 to 5.5 VFO is pre mixed with the 11.00 MHz heterodyne oscillator to give 16.0 to 16.5 and the signal frequency (7.0 to 7.5) is subtracted to give the 9.00 MHz IF (LSB is normal mode, carrier oscillator is 8.9985 MHz)

14.0 MHz (20M Band) - (VFO) The 5.0 to 5.5 is mixed with the signal frequency by subtraction to give the 9.00 MHz IF frequency (USB is normal mode, carrier oscillator is 8.9985 MHz)

21.0 MHz (15M Band) - 35.50 MHz heterodyne. The 5.0 to 5.5 VFO is pre mixed with the 35.5 heterodyne oscillator to give 35 to 30.5 and the signal frequency of 21.0 to 21.5 gives the 9.0 MHz IF (USB is normal mode, carrier oscillator is 9.0015 MHz)

28.0 MHz to 30 MHz (10 Metre Band) the heterodyne frequencies are 42.50, 43.00, 43.50 and 44.0 MHz These mix with the signal frequencies to produce the 9.0 MHz IF (USB is normal mode, carrier oscillator is 9.0015 MHz)

### **Heterodyne crystals**

11.00 MHz (40 Metre band), 35.50 MHz (15 Metre band), 42.50, 43.00 (only this one was usually fitted in the factory) 43.50 and 44.00 (10 Metre band)

## **Why do we use LSB for 40 Metre and below and USB above 40 Metre ? – Page 2**

Some of the rigs produced during the early days of commercial SSB production had 27 MHz as standard band as it was a genuine Amateur Radio frequency in those days. Usually marked as 11 Metres on the front panel. Later versions were sometimes home modified to change one of the 10 Metre positions on the band switch from 28 MHz to 27 MHz.

**Note:** Using this scheme, the 10 Metre band required four Heterodyne crystals to cover the entire 2 MHz of this band. In rigs produced after the 27 MHz frequency was allocated to Citizen Band Radio you may find one of the 10 Metre band crystals has been changed or added to cover the 27 MHz CB band. This crystal will be 42.00 MHz. If you find this you may also find the 28 MHz tuned circuits have been altered to accommodate the 27 MHz CB band and may not function correctly on 28 to 30 MHz.

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